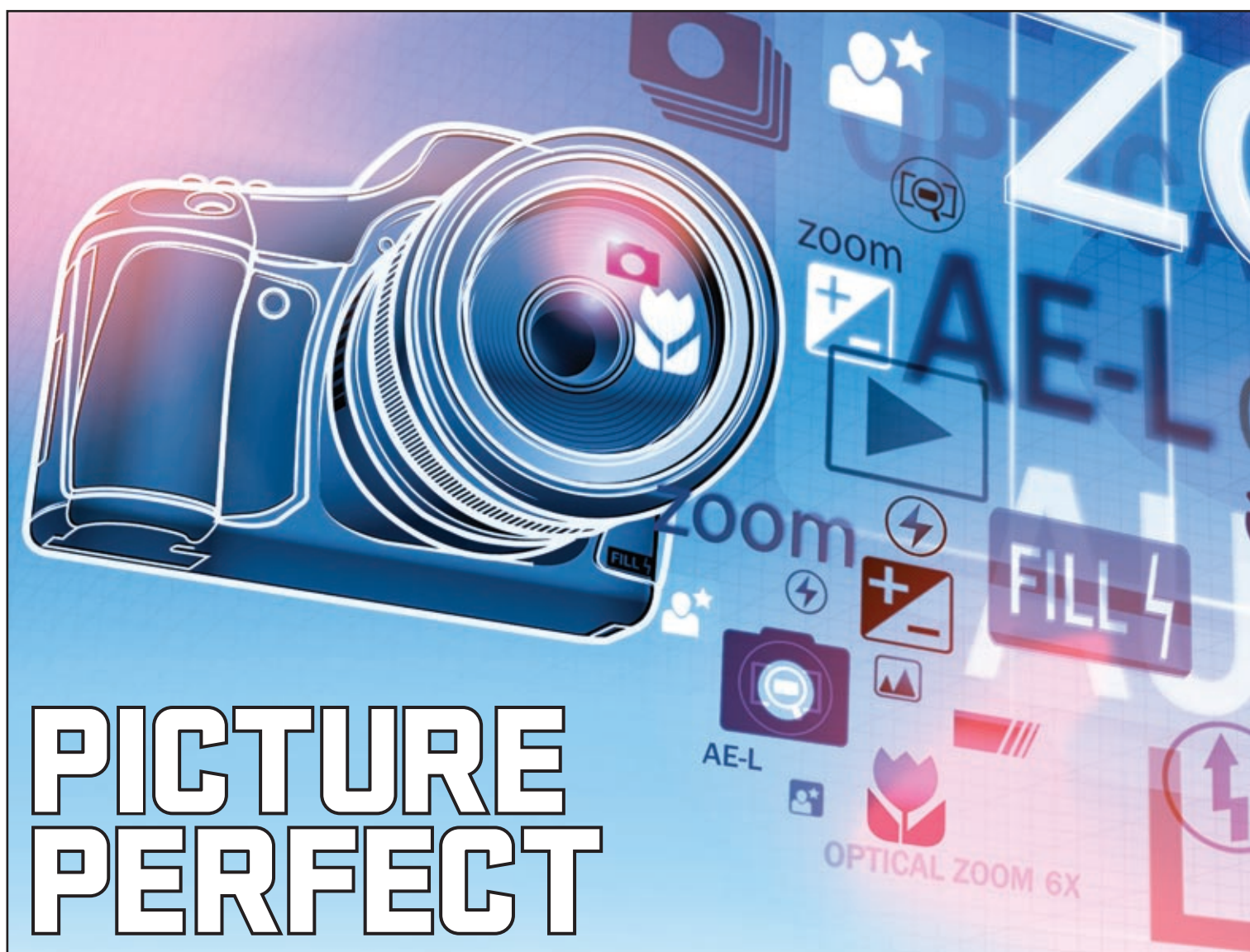




PICTURE PERFECT

Overawed by your digital camera? Gordon Laing demystifies all those settings and shows you how to use its features to get the perfect photo every time

Digital cameras now dominate photography. Most of us have abandoned film cameras in favour of this new technology that lets us view images straight away, frame photos with the screen and re-use memory cards. There's also a vast number of features on digital cameras that you just won't get on a film camera.

However, nearly all of us simply switch the camera's settings to automatic and leave it there.

It is often a lot easier to do this than try and work your way through a jargon-filled manual. This is a missed opportunity. Even basic digital cameras offer a wealth of features that can be used to improve your snaps. For example, the kind of indoor lighting that can cause film photos to come out looking orange or green can be easily compensated for using digital cameras. And while camera film is available in a variety of sensitivities, you have to finish the roll before

you change it. A digital camera lets you switch to a higher sensitivity for just one shot if you like, before switching straight back to normal again.

Here we'll explain the benefits of digital photography and how to make the most of your camera. We'll also show you how to take more creative photos, controlling the exposure, depth of field, and using the flash for special effects. So break away from Auto and find out what you and your digital camera are capable of.

Understanding megapixels

The term megapixel means one million pixels. It is calculated by multiplying the number of horizontal and vertical pixels in an image. So if an image has 2,816x2,112 pixels, for example, it will have 5,947,392 pixels in total, or around six megapixels for short.

An 8-megapixel image will typically have 3,264x2,448 pixels, while a 10-megapixel image will have 3,648x2,736 pixels. In these two instances each additional two million pixels is equivalent to having around 400 extra pixels horizontally and 300 extra vertically.

These extra pixels allow you to zoom in on your subject or make larger prints without reducing quality. So-called 'photographic quality' prints from labs require 300 pixels per inch, so a 6-megapixel image with 2,816x2,112 pixels can be enlarged to around 9x7in before it loses any quality. Increasing the image to eight megapixels gives you an extra inch in height, and 10 megapixels give you another inch again.

More megapixels are not always better, though. In theory they should be, but if a manufacturer increases the resolution without

making the sensor larger, each pixel will become smaller. This makes them less sensitive to light and more susceptible to random speckles of electronic noise, especially in dim lighting. The finer the pixels, the better the lens needs to be.

This is why digital SLRs, with their physically bigger sensors, produce better-quality images than compacts with the same number of megapixels. It is also why the tiny sensors and lenses in mobile phone cameras typically provide poor-quality images regardless of the number of megapixels.



Resolution, compression and quality settings

Every digital camera has a variety of quality settings that allow you to trade picture quality against file size in order to squeeze more images on to your memory card. Although this was useful in the days when memory cards were small and expensive, today's high capacities and low prices mean there's no need to compromise the quality of your photos by making the file sizes smaller.

It's important to understand your camera's quality settings, as most of them are set up to record images in a medium-quality mode as standard. Unless you change the settings, therefore, your camera may not be delivering the best possible quality.

The most important setting is the image resolution. This simply refers to the number of pixels in your image. The more you have, the greater the detail recorded. For a better understanding of the relationship between pixels and digital cameras, see the 'Understanding megapixels' box opposite.

All digital cameras allow you to reduce their operating resolution, but there's no point unless you're about to run out of memory or you know you're never going to print your photos; if they're only going to appear on a web page, for example. Recording at your camera's maximum resolution gives you the greatest flexibility for printing or cropping later. And why pay for lots of megapixels if you're not going to use them?

Once you've taken your photo, most cameras will record the image as a JPEG file. This compresses the data to save space, and you can control the degree of compression. The higher the compression, the more pictures you'll squeeze on your card, but again at the cost of quality. If the compression is set too high, you'll permanently lose fine detail, edges will look fuzzy and you may even notice the

blocky or banding effect you get with some digital television channels.

Most digital cameras have three different JPEG compression settings, often labelled 'Good', 'Better' and 'Best'. We think it's more realistic to call them 'Terrible', 'OK at a push' and 'Fine'. So again, unless you're never going to print your photos or are about to run out of memory, always put your camera on its best-quality JPEG setting.

Pricier digital cameras offer an alternative file mode called RAW. This records the RAW data from the camera before it has had a chance to convert it into a JPEG. This means you need to convert it later using software on your PC, but it gives you complete control over a number of settings, including the compression.

The requirement to process RAW files with your computer – not to mention the fact that they typically measure around four times more than a good JPEG – means they're generally used only by professionals or enthusiasts, and even then rarely for every single image. The easiest and most practical way of maximising your camera's quality is to have it record JPEGs at the highest resolution and least compression.



▲ Make sure you use the highest resolution and lowest compression for the best quality photos

Digital versus film

There are a number of useful things you can do with a digital camera that you can't do with most film cameras. Most compact digital cameras that use their main colour screens for composition can also overlay a variety of graphics to improve your shots. Many offer a 3x3 grid, which can help with alignment or avoiding squint horizon lines – that is, where the horizon line isn't at right angles to the edge of the frame. If your camera offers this facility, you can normally switch the grid on and off by pressing the Display button.

These grids also help you apply the established photographic rule of thirds, where placing key objects (such as a person's face) at the points where the lines intersect will deliver a more pleasing composition.

When it comes to judging an exposure, you can just check the screen. But there is a more scientific way. Many cameras have a histogram facility that's available on playback. This displays a graph revealing the range of tones in an image from black on the left to white on the right. If the graph is biased towards or stops dead at the left or right side, it indicates an under- or overexposure. More sophisticated cameras may offer a live histogram facility that shows a constantly

updated graph of tones as you compose your shot. This shows you the technical effect of an exposure adjustment before taking the picture.

On the subject of checking photos, always zoom in on important images after taking them to check that they're truly in focus. Digital camera screens may be great, but they're not sufficiently detailed to reveal any problems unless you zoom in for a closer look.

Modern cameras now allow you to apply various digital effects, such as black and white or sepia filters, while others may let you crop an image or even retouch red eye. While software on a PC ultimately offers greater flexibility, it can be handy to use these in-camera editing facilities if you're connecting directly to a printer.



▲ Many cameras can overlay a grid to help with composition



▲ Histogram graphs reveal the range of tones in an image



▲ In-camera effects can turn photos black and white if desired



A guide to exposure and metering

Photography is all about exposure – that is, allowing the right amount of light into the camera to generate a perfect image. Photographic exposures consist of just two variables: the amount of light the lens allows into the camera and the amount of time the sensor is exposed to it.

The period of time for which a sensor is exposed is known as the exposure itself, and it is measured by a shutter speed. The term 'shutter speed' refers to a physical curtain that opens and closes within the camera body. While digital SLRs still employ them, many digital compact cameras just emulate the effect by switching their sensor on and off for the required period.

Typical shutter speeds for daytime photography are generally a small fraction of a second. An exposure of $\frac{1}{100}$ or 100th of a second is typical, although faster shutter speeds are better at freezing action, while slower ones can blur it. Photos taken at night require exposures that could last several seconds. See opposite for tips on the creative use of the shutter speed.

An adjustable iris called the aperture controls the amount of light a lens allows into a camera. If the aperture is wide open, it will allow in more light than when it's closed down to a small diameter. The diameter of the aperture can also control how much of the image is in sharp focus (see the 'Using aperture for creative effects' box opposite).

So the technical side of exposure simply involves finding the right combination of aperture and shutter speed for the camera's sensitivity (see the 'Working with ISO and sensitivity' box on page 128) and the current lighting conditions. The amount of light required for an ideal exposure is programmed into modern cameras. The camera simply uses its light meter to measure the brightness of the subject, then looks up the ideal exposure settings to record it.

Since most photos consist of light and dark areas, though, the question is which area should be measured. Early cameras used spot meters, which measured only the brightness in the very middle of the frame. Later models offered enhanced metering known as centre-weighted metering, which measured the brightness in a larger area, but still biased to the middle. With



▲ Basic metering systems can be fooled into underexposing by bright areas in a composition

both systems you'd typically point the camera first at the area you wanted exposed correctly for a reading before recomposing the shot.

Today, more sophisticated metering systems split the frame into multiple segments and measure the light in each. Then they attempt to figure out the kind of photo you're trying to take and ignore areas that might influence the metering incorrectly. Some cameras do this better than others, but the best employ hundreds of metering segments and a library of 'perfect' images to refer to.

Most cameras offer the choice of spot, centre-weighted and segmented metering systems, and for general purposes the latter is the best. If you find your camera is getting a certain exposure wrong, you could try a different metering system to judge better the area you want exposed correctly.



▲ Superior metering systems do a better job of judging the entire scene

Exposure modes

Modern cameras have a wealth of exposure modes and options, which at first seems a little odd since they already know the 'perfect' exposures for a wide variety of lighting conditions (see 'A guide to exposure and metering' above).

The reason we have this choice is because photography is about more than just getting the right amount of light into the camera. Certain subjects benefit from different combinations of shutter speed and aperture, and of course you might not agree with your camera about the perfect exposure.

The shutter speed and lens aperture can be used to control the exact amount of light entering your camera and striking its sensor. While there's a typical combination, which your camera will suggest for a given situation, it's also possible to achieve the same exposure by increasing one and decreasing the other to compensate. For example, if you doubled the shutter speed and therefore let in half as much

light, you could open the aperture to let in twice as much to compensate, or vice versa. You would do this to record certain subjects better or achieve creative effects (see the boxes on creative effects opposite).

The most popular exposure mode is Automatic, often indicated by a green symbol. This automatically chooses a shutter speed and aperture for the given conditions, but it won't have anything creative in mind; indeed, it often hides a lot of your camera's advanced options. Automatic modes also tend to fire your flash when they think you need it, although you may prefer they didn't (for more on this, see 'Making the most of your flash' on page 130).

The next exposure mode is Program, or P for short. Program mode is also fully automatic, with your camera selecting an aperture and shutter. In addition, it will reveal the settings hidden in Auto mode. Program normally also lets you choose when the flash goes off. Consequently, Program mode is like Automatic

for discerning photographers, and we'd recommend it for general use.

Better digital compacts and all digital SLRs offer Aperture and Shutter Priority modes, normally labelled A and S respectively, although Canon refers to them as Av and Tv. Aperture Priority lets you choose the aperture and the camera will automatically select a shutter speed to match. Conversely, Shutter Priority lets you choose the shutter speed with the camera selecting an aperture to match. So they're still automatic, but with a little more control.

Most models also offer a Manual exposure mode that lets you choose the shutter speed and aperture, with the camera warning you if it thinks you'll under- or overexpose as a result.

All but the most professional cameras also offer scene presets, which optimise the settings for certain conditions, such as portraits, landscapes or night shots. These are a great way of achieving creative results without delving into the technicalities.



▲ Use the command dial to adjust the exposure mode manually



▲ Shutter Priority lets you choose the right setting for action shots



▲ Manual modes let you set long exposures for special effects



Using aperture for creative effects

When photographers talk about adjusting the aperture, they're referring to an iris normally located within the camera's lens. As the diameter of this iris shrinks, the amount of light entering the camera is reduced. But an interesting and useful side effect of shrinking the iris is that it also increases the range of distances in sharp focus. This range is known as the depth of field.

For instance, if you're taking a photo of a landscape, you might want everything near and far to be in sharp focus – a large depth of field. If you're taking a portrait, you may prefer only the main subject to be sharp and the background blurred – a small depth of field.

Most cameras have a number of settings for the iris diameter, and therefore allow you to control the depth of field. These settings are called f-numbers, and you can adjust them using your camera's Aperture Priority mode.

Small f-numbers mean only the main subject is in focus; larger f-numbers mean a larger range is in focus. So for portraits with blurred backgrounds, choose the smallest f-number, while for a landscape with the maximum in focus, choose a large f-number.

The effect of the f-numbers varies between lenses, so you'll need to experiment to find which give the desired effect on your particular equipment. The focal length of the lens can also be used to exaggerate the depth of field. Wide-angle lenses inherently have a larger depth of field, so if you want the maximum in focus, it's best to zoom out. Conversely, telephoto lenses have a much smaller depth of field, so if you want the minimum in focus, it's best to zoom in.

Remember that bigger f-numbers also mean less light getting into the camera. It therefore

needs a slower shutter speed to compensate, so the risk of camera shake is increased.

You may also notice the picture quality varies slightly with different f-numbers. This is normal, and all lenses have a 'sweet spot' where they perform at their best. For compacts this will generally be around the f2 to f4 range, while for a digital SLR lens, it will be around f8. Of course this figure may not correspond to the depth of field you're after, but it's worth knowing for general use. Luckily, most cameras in automatic mode will aim for this aperture.



▲ Use a small depth of field to blur the background in portraits



▲ Use a large depth of field to keep near and far objects in focus

Using shutter speed for creative effects

The shutter speed controls for how long the sensor is exposed. When a subject is moving, the natural desire for most photographers is to freeze the action. This is appropriate for many sporting events, whether it's a footballer running towards you or a tennis player serving the ball. It's an equally appropriate response to capture a brief moment in time that may be missed by the human eye, such as a balloon exploding.

The first half of the challenge is selecting a quick enough shutter speed to freeze the action. Generally speaking, fast action will require a shutter speed of at least 250th of a second, or $\frac{1}{250}$. To stop something in its tracks completely you may need something faster still, such as 1,000th of a second, or $\frac{1}{1,000}$.

To adjust the shutter speed, simply put your camera into Shutter Priority mode and it will find an aperture to match. As the shutter speed becomes faster, the amount of light entering the camera decreases and you or your camera will need to open the aperture or increase the sensitivity to compensate.

The other half of the challenge is your timing. You should get to know your camera and how long it takes between pressing the

button and it actually capturing the photo. Some compact cameras can be quite slow, but if you can anticipate when the ideal moment is going to take place, you can always press the button fractionally in advance.

Another trick is to select your camera's continuous-shooting option and just keep the button pressed down as the action takes place. Your camera will then take several photos in quick succession and with any luck at least one will look great.

Sometimes, freezing the action can produce lifeless images. We know from childhood art classes that blurred objects look as if they're

moving quickly, so why not emulate the effect in photography? Instead of a quick shutter speed, go for a relatively slow one such as a 30th of a second, or $\frac{1}{30}$. Anything in motion will become blurred, and this effect can look great with waterfalls, for example.

A particularly effective trick is to choose a slow shutter speed, then move your camera to follow a subject zooming past as you take the photo. If you keep the subject in the middle of the screen or viewfinder it will remain relatively sharp, but the background will become blurred, lending the effect of speed. This is a great trick when photographing races or airshows.



▲ Fast shutter speeds will freeze action, but it's not always the best technique



▲ Use slower shutter speeds to blur action and make water look dream-like

Let there be light Using exposure compensation

While modern cameras are packed with technology, sometimes they misjudge a scene and under- or overexpose it. Then again, the camera could make a technically perfect exposure, but you'd prefer it to look a little brighter or darker.

Luckily, it's simple to tweak the exposure without worrying about apertures, shutter speeds or metering systems. Virtually every digital camera these days is equipped with exposure-compensation controls, which

allow you to make the picture brighter or darker than the camera suggests.

To use exposure compensation, you use a button that is usually labelled with a plus and minus symbol. This should present a scale on your screen from +2 to -2 in units called EV. A setting of +1 EV will double the brightness, while -1 EV will halve it.

If you're photographing the inside of a room and light streaming through a window is fooling your camera into underexposing the

picture, you can experiment with a setting of +1 or even +2 EV. If your subject is very bright – for example, a distant mountain or canyon vista – consider using a setting of -1 EV to darken it.

Minus settings also work very well with sunsets and can render foreground objects into attractive silhouettes. Whatever you do, though, remember to return the scale to 0 afterwards or all your photos will come out too bright or dark.



Working with ISO and sensitivity

One of the major benefits of digital cameras over film cameras is the ability to adjust their sensitivity from shot to shot. Low sensitivity settings give the best-quality results, but require plenty of light. Higher sensitivity settings may reduce the picture quality, but allow you to photograph under lower light conditions and avoid camera shake.

While camera film is available in a wide variety of sensitivities, it's fixed for the entire roll. So if you picked a high sensitivity film optimised for low light, you'd be stuck with the same roll of film for, say, 24 or 36 exposures. You could still use it in bright daylight, but the quality would be compromised. With digital, though, you can adjust the sensitivity for every single shot if you like – it's incredibly convenient.

Photographic sensitivity is measured in units of ISO; this uses the same numbers as the older ASA scale. A measurement of ISO 100 or below is considered to be low sensitivity, or 'slow'. ISO 200 is generally considered to be normal sensitivity, and ISO 400 and above is high sensitivity, or 'fast'. Most compact digital cameras offer a sensitivity range of ISO 100 to 400, with newer models offering 800 or even 1,600 options. Digital SLRs typically offer ranges up to 1,600 or even 3,200 ISO.

Doubling the ISO figure doubles the camera's sensitivity, so ISO 200 requires half as much light as ISO 100; this in turn allows you to achieve the same result with an

exposure that's twice as fast. A sensitivity setting of ISO 1,600 therefore requires 16 times less light than 100 ISO, which in turn allows you to achieve the same result with an exposure 16 times as fast.

Since higher sensitivities allow faster exposures and thereby reduce the risk of camera shake, you might imagine that they would be preferred for general use. As mentioned earlier, however, the picture quality deteriorates as you increase the sensitivity. The higher the ISO, the more electronic noise will appear on the picture. This looks like random coloured speckles, a little like 'snow' on badly tuned analogue TVs, and is particularly noticeable in darker areas. Most cameras employ noise reduction features, but use too much and you can smear out fine detail.

The amount of noise also varies between cameras. Compact cameras suffer from much

more noise than a digital SLR at a given sensitivity. Both types of camera may produce clean-looking images at ISO 100, but increase the settings to ISO 400 and the compact's images will be much noisier. If you can increase both to ISO 1,600, the digital SLR's photos will still be acceptable, whereas the compact's will look horrible.

Most digital cameras are set up to adjust their sensitivity automatically, but for the best results you may want to set it manually. If the conditions are bright and you can hold the camera steady, select an ISO of 100 or 200. If it's getting dimmer, or you're experiencing camera shake with the lens zoomed-in, try increasing the ISO to 400 or 800. It's best to avoid ISO 1,600 or higher unless you really have no choice. The quality will be compromised, but it's still preferable to camera shake.



▲ High ISO sensitivities let you take indoor photos without a flash



▲ High sensitivities also allow you to use quick exposures to freeze action

Understanding white balance

The ability to adjust white balance is one of the most powerful controls on a digital camera, yet it's one that is rarely used by most photographers. It allows your camera to compensate for the coloured tints of different light sources, such as the orange of indoor lamps, the green of fluorescent strips or the blue-ish shades you can have on an overcast day.

This is a major advantage digital cameras have over film models. Most camera film is 'daylight-balanced', which means it treats only midday sunlight as pure white. Most other light sources, though, are actually a slightly different colour, and this can produce unwanted effects.

For example, candles or indoor tungsten light bulbs have lower 'colour temperatures' and give off a slightly orange tint. Cloudy or overcast conditions have higher colour temperatures and give off a blue tint. If you were photographing with daylight-balanced film under these conditions, your photographs would come out with orange or blue tints respectively. The only way to correct the problem would be to attach special coloured filters, which is clearly not ideal.

The electronic nature of digital cameras, however, allows photographers to specify what kind of light should be treated as pure white, and therefore compensate for unwanted colour casts. All digital cameras offer this facility with their white balance controls, but most people leave them set to Auto (or AWB). In Auto White Balance mode,

your camera does a reasonable job of figuring out what's really white light, but sometimes it can get it wrong. This most commonly occurs with indoor lighting, and the result is often an orange-tinged photo.

The solution is to adjust the white balance setting manually yourself. Most cameras offer a number of white balance presets for different lighting conditions – such as indoor, fluorescent, cloudy or shade – and you can see their effect on your screen instantly. Just choose the one to match the current conditions and take the photo. Remember to switch it back to Auto afterwards, though, or all your subsequent photos will have the wrong colour balance.

More advanced digital cameras alternatively allow you to adjust the colour temperature itself or fine-tune the presets to match the conditions precisely. Some additionally offer custom white balance

options so you can simply point your camera at whatever you'd like it to treat as white, such as a white card or plate.

It's also worth mentioning that not all coloured effects are unwanted. Automatic white balance settings can often reduce or remove the impact of a brightly coloured sunset or deep blue sky. They may also counteract the effect of polarising filters. In situations such as these, if you manually set the white balance to Daylight you will retain the colours you're after.

Finally, if your camera is having problems figuring out white balance but you don't have time to correct it manually, just set your camera to record the image in RAW mode if available (see the 'Resolution, compression and quality settings' box on page 125). This gives you the chance to adjust the white balance setting on your computer afterwards.



▲ Photos taken under indoor lighting often have an orange tint



▲ The same shot with the White Balance set to Tungsten looks much more realistic



The dark side Taking night shots

Photographs of city lights at night can look spectacular, but they cause all manner of problems for cameras set to automatic modes. With just a few manual adjustments, though, you'll be ready for action.

Night photography involves working with low light, and that means longer exposures than normal. If your camera has a manual mode, set the aperture to the smallest f-number to let in the most light and try a shutter speed of one second. Most cameras indicate seconds using double quotes. Unless you're also trying to capture someone in the foreground, switch your flash off. It won't

have any effect and it can fool your camera into underexposing the shot.

Next you'll need to find somewhere steady to place your camera. If you don't have a tripod, balance your camera on the edge of a post, fence or ledge and hang on to the strap in case it falls. By placing it on an item of clothing, you'll be able to make some compositional adjustments.

Finally, to avoid moving the camera when you take the photo, use the self-timer. If the result comes out too bright or dark, use a faster or slower shutter speed. Remember to put your camera back to Auto afterwards.



▲ If you don't have a tripod, balance your camera on a ledge for great night shots

Printing and tweaking tips

Most modern digital cameras can now connect directly to your printer to produce quick and easy prints. Alternatively, if you don't have a printer you can walk into almost any high-street lab and order prints from your memory card. But while printing your digital photos may no longer require a PC at home, there are still many benefits to tweaking them first using software such as Adobe Photoshop Elements or Paint Shop Pro.

Compositions that are slightly squint (in other words, not quite straight) look much better when straightened. Many images also benefit from cropping. While many cameras and printers offer built-in cropping facilities, you'll have much more precise control using software on your PC. If you intend to print your image afterwards, though, make sure that the crop matches the shape of standard prints or it will end up being cropped further (as we'll explain shortly).

A boost in contrast or saturation can often help images taken under dull conditions, or perk up a sunset composition. If there's not a great deal of colour in the image you could even consider converting it to black and white for a more pleasing effect.

Software also gives you the chance to retouch selected portions of the image, eliminating demonic red-eye or removing unwanted objects such as tourists spoiling an otherwise deserted landscape photo.

Finally, whether you're cropping an image or leaving it at the original size, take a moment to consider its shape, or aspect ratio. If you choose a print size that doesn't match the shape of your image, you'll end up cropping either the sides or the top and bottom.

Most consumer digital compacts take photos that are the same 4:3 shape as a non-widescreen TV. These images are actually slightly taller than the popular 6x4in postcard

print shape, so if you order them you'll end up having thin slices cropped from the top and bottom of your photos.

Many photo labs and online services now offer slightly taller 6x4.5in prints to perfectly match the shape of most digital compacts, although these in turn won't squeeze into albums designed to accommodate 6x4in prints.

One solution is to go for the larger and slightly squarer 7x5in print size. It may not exactly match the shape of consumer 4:3 images, but it's much closer than 6x4in prints and there are plenty of albums designed to accommodate them. The larger 10x8in print size is also a relatively close fit.

Note that most digital SLRs take wider photos with a 3:2 aspect ratio. These perfectly fit the shape of 6x4in prints, but 7x5in or 10x8in prints will crop the sides. If you're a DSLR owner who's after a bigger print without cropping, go for 9x6in or 12x8in prints.

Avoiding camera shake

Camera-shake is responsible for spoiling countless photos, but there are a number of steps you can take to prevent it – or at least greatly reduce it.

Technically speaking, camera shake occurs when an exposure isn't quick enough to freeze the natural shake of your hands. The way to avoid it, therefore, is either to use a quicker exposure or reduce the amount of natural shake in the first place.

A basic rule that works for most people is to use a shutter speed that's one over the effective focal length. So if you're using an effective focal length of 30mm, for example, try and use a shutter speed of $\frac{1}{30}$ or quicker. If you're zoomed in to an effective focal length of 100mm, go for a shutter speed of at least $\frac{1}{100}$. Clearly the more powerful the lens, the quicker the shutter speed you'll need.

Digital SLR users should remember that most models effectively multiply their actual lens focal lengths by one and a half times, so a kit lens zoomed to 55mm is effectively working at 83mm, thereby requiring a shutter speed of at least $\frac{1}{80}$.

Although a sufficiently fast shutter speed should eliminate any amount of camera shake, it's not always practical or possible to alter the shutter speed with the available light.

By taking a little care with your camera technique, however, you can greatly reduce the amount of shake to start with.

It may sound obvious, but the first step is to hold your camera as steady as possible. Always use both hands, and if you're using a digital SLR, support the barrel of the lens with your left hand. Keeping your arms closer to your body will also reduce shake, and if there's a wall or post nearby, consider leaning on it. Pressing the shutter release button gently and breathing out as you do so can also make a big difference.

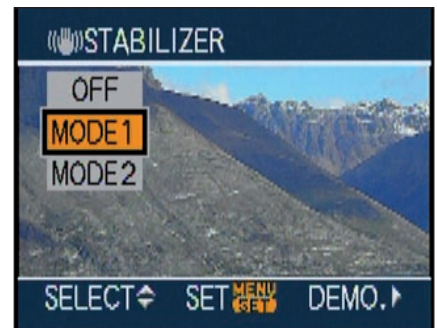
If the exposure is simply too long to hold in your hand without shaking, then consider



▲ To reduce camera shake, always use both hands to hold the camera

balancing your camera on a ledge and using the self timer to take the shot.

Many cameras and lenses now feature image stabilisation to combat camera shake. The best models will feature special optics in the lens or a moving sensor to counteract any wobbles, and most should offer up to three 'stops' of compensation. Since one stop is equivalent to halving the exposure, three stops would halve it three times in a row. So if you could previously hand-hold at a shutter speed of $\frac{1}{30}$ at a given focal length, you would now be able to get the same result at just one quarter of a second.



▲ Some cameras offer built-in image stabilisation to reduce camera shake



Making the most of your flash

Camera flashes are well-known for indiscretion and creating demonic red-eye effects, but they can actually prove to be one of the most valuable allies for any photographer. The trick is to understand their limitations and the various options your camera has to offer.

The range of a typical popup flash is just a few metres, beyond which it will have no effect whatsoever. There's therefore no point using a flash at a concert unless you're in the front row, and no point using it to illuminate distant buildings at night.

The trouble is that most cameras set to automatic judge only light, not distance. They see a dark view and believe the flash is the best way to illuminate it. Unfortunately, if the subject is more than a few metres away, the flash will have no effect at all. Worse, because the camera expected the flash to illuminate the subject, the picture will be woefully underexposed.



▲ Force your flash to fire when photographing people in dim conditions

The first trick is learning how to switch your flash off. Most cameras control their flash options using a button labelled with a lightning bolt. To switch the flash off, just press it until you see the lightning symbol with a circle round it and a line through it. With the flash off, your camera will have to make the most of the available light and adjust the exposure to compensate. Note that longer exposures may require a tripod or a steady spot for the camera to avoid shake (see 'The dark side' on page 129).

The next trick with your flash is forcing it to go off when your camera thinks it's not required. If you're taking a photo of someone under dimmer conditions or with a very bright background, the person can often look a bit dark. So long as they're within a few metres, though, your flash can provide a boost. This is known as a fill-in flash. Again, you press the flash button until the lightning symbol is always there, which means it will go off every time.



▲ For great sparkler photos, combine a long exposure with a rear-curtain flash

Taking this concept a step further is the slow-synchro option. This combines the flash with a longer exposure both to illuminate a person in the foreground and capture lights in the background. It's ideal for photographing people against a city skyline at night.

More sophisticated cameras offer an additional 'rear curtain' option. This fires the flash at the end of a long exposure rather than the beginning. This allows you to use a long exposure to trail moving lights, then have the flash freeze the subject at the end. It's particularly effective when photographing children twirling sparklers on Bonfire Night.

Finally, we can't talk about flashes without discussing red-eye, where flash-light is reflected back from the retina. Red-eye reduction modes help by firing the flash several times in an attempt to reduce the pupil's size, but for better results you'll need to use brighter conditions, an external flash gun or software to remove it later.



▲ Flashes are great for freezing fast action such as exploding water balloons

Focusing modes

Focusing is another fundamental aspect of photography, and most cameras offer more than just auto and manual options.

If you only learn one technique for your camera it should be how to lock the focus. To do this, simply point at your subject and press the shutter release button halfway down; this will focus the camera, but not actually take the picture. With the button held in this halfway position, you're free to move the camera and recompose the picture, perhaps positioning a person to one side as they look out over a view. Once the composition looks right, just push the button all the way down to take the shot.

Every camera has this feature. The trick is learning how much pressure is required to hold it and not accidentally take the photo. Of course, a digital camera allows you to practise and delete any pictures taken by mistake, so before long you'll master the technique.



▲ Many cameras mistakenly focus on the background in portrait shots

This can be invaluable when photographing two people. Many cameras blindly autofocus on the middle area, which could be between your two subjects. The result is a sharp background with two blurry people in front of it. To avoid this, simply point your camera at one of the people, lock the focus, then recompose before pressing the button all the way to take the shot.

Focusing can also prove problematic when shooting very close subjects, such as flowers or insects. Most digital cameras, especially non-DSLRs, have amazing close-up capabilities, but first you'll need to activate the Macro mode by pressing a button, which is usually labelled with a flower. Every camera has a closest focusing distance; check your manual, but typically it'll be less than 20cm; some models can even focus as close as 1cm, so put it in Macro mode and get as close as it allows. Just remember to put it back to autofocus afterwards.



▲ The trick is to point the camera at the person and lock the focus

If you've ever tried to take a photograph through a window, you may have found that the camera focuses on the glass, rather than the view. To avoid this, simply focus the lens manually to 'infinity', indicated by a figure 8 on its side. Infinity for most lenses is anything more than a few metres away, so it's perfect for views through windows or of night skies. Again, return it to autofocus afterwards.

More sophisticated cameras, including most digital SLRs, offer the choice of focusing modes optimised for static or moving subjects. Although you'd use the former mode for most situations, the latter can actually stay focused on a subject that's in motion, such as an athlete running towards you.

Many also allow you to give auto-focus priority to specific areas of the frame, which can be handy if your subject is always off-centre and you don't have time to lock the focus.



▲ With the focus locked you can recompose and take the shot



Through a glass, clearly Taking photos through windows

Some of the best views can be had through the windows of tall buildings or tourist attractions such as the London Eye. The trouble is our cameras often end up taking photos of the window itself, rather than the view beyond. Luckily, it's easy to take great-looking photos through windows that almost look as if you were standing outside.

If you can actually stand outside, or even just poke your lens through a gap in an open window, then do so. A photograph taken outdoors will always look better than one taken through glass.

If you do have to photograph through a window, however, find a clean portion and press your lens right up against the surface

of the glass. This will minimise the chance of photographing the window itself, while the end section of your lens barrel should protect your actual lens from scratches. If you have to tilt your camera for the best composition, shield any gaps between it and the window's surface with your hands or an item of clothing to avoid reflections.

The next trick is to set your lens manually to focus at infinity, which is usually indicated by a figure 8 on its side. This will tell your camera to focus on the view and not the window itself, but remember to put it back to autofocus afterwards. Finally, switch off the flash, as it will just cause unwanted reflections on the window's surface.



▲ Hold your camera against the glass for great photos through windows

Using a digital SLR

Digital SLRs have become the camera of choice of discerning photographers, whether they're upgrading from a compact or an older film SLR. While they may at first look familiar, especially to existing film SLR owners, there are a number of differences to be aware of, as well as different techniques for getting the most out of them.

If you're switching from a digital compact, the biggest difference will be how you compose your shot. While a handful of digital SLRs can frame a shot using their main colour screen, the vast majority cannot. Instead, you'll need to put your eye right up to the optical viewfinder and look through it. Like film SLRs before them, these optical viewfinders look through the main lens and allow you to check the focus accurately as you compose the shot.

All but the cheapest digital SLRs also offer a depth-of-field preview button, which temporarily closes the lens iris to reveal the range of distances that will be sharp (see the 'Using aperture for creative effects' box on

page 127). The smaller iris means the view looks dim for a moment, but it's still a useful facility.

One of the best aspects of a digital SLR is having a physically large sensor. A typical digital SLR sensor can have 10 times the surface area of a compact camera's sensor, even if both cameras have the same number of megapixels. This means the digital SLR's individual pixels are larger and therefore more sensitive to light. So while most compact images start to look noisy at ISO 400 or even 200, a digital SLR should remain usable up to ISO 800 and beyond, so feel free to increase your sensitivity and experiment.

Probably the most important aspect of digital SLRs is their ability to swap lenses. This provides enormous creative flexibility, although beware of dust when changing them (see the 'Cleaning dust from a DSLR' box below).

Another thing to be aware of is that most digital SLR sensors, while larger than compact sensors, are smaller than a frame of 35mm film. The vast majority measure around 24x16mm, compared to the 36x24mm of 35mm film. This means that any lens you attach will in effect

reduce the field of view by around one and a half times compared to a 35mm body.

The typical 18-55mm kit lenses supplied with most DSLRs actually deliver an equivalent range to 27-83mm on a 35mm body. If you were to fit an older 50mm 'standard' lens, it would actually work like a 75mm short telephoto lens. If you're into wide-angle photography, you'll therefore need a much shorter focal length lens than you would with a film SLR.

Some brands also have slightly different field-reduction factors. Canon's non-professional digital SLRs in effect multiply all lens focal lengths by 1.6 times, while Olympus and other cameras using the 'Four Thirds' standard multiply them by 2x. Canon's professional digital SLRs have sensors with either 1.3x or 1x factors. The latter include so-called 'full-frame' sensors that match the size of 35mm film and therefore don't affect the lens focal length. These models are very expensive, though. What's more, ultra-short focal length lenses designed for other digital SLRs have solved wide-angle issues for most photographers.

Cleaning dust from a digital SLR

Dust is the bane of digital SLR owners' lives. It enters the camera's body when you remove or swap lenses and settles on a filter that protects the sensor. The dust then casts small shadows on the sensor when you take photos, resulting in faint, but annoying, dark patches; these will be slightly fuzzy because the dust itself is slightly in front of the actual sensor's surface.

Dust marks are most obvious in areas of relatively flat colour such as skin or blue skies. As luck would have it, these are also the kind of areas that are easiest to retouch later, but there are steps you can take to reduce or eliminate dust before it gets to your photos.

Many new digital SLRs combat dust by vibrating the filter in front of the sensor in an attempt to shake any particles free. Digital SLRs that include built-in stabilisation often use the same mechanism to shake the sensor. Any particles that are successfully shaken free fall on to a sticky pad within the body.

In our tests, though, most of these anti-dust systems aren't 100 percent infallible, with

stubborn dust marks often refusing to budge. In these situations you'll need to apply a tried and trusted technique used by owners of digital SLRs without anti-dust features – blowing them off.

All digital SLRs have a menu option that opens their mirror and shutter curtain to reveal the sensor. You normally need a fully charged battery before it'll work, however. With the lens removed and the shutter open, hold the camera body face down, then use the blower portion of a blower brush held just outside the body to squirt two or three gushes of air toward the sensor (see the picture, right).

Next, switch the camera off to close the shutter and put the lens back on. If the dust marks remain, repeat the process. To spot dust marks easily, take a photo of a white wall from close range with your lens zoomed in and focused to infinity, and with the aperture set to a big f-number.

To prevent dust marks in the future, always change lenses as quickly as possible and with the body switched off and facing down. It also helps

to do so in non-windy conditions if possible. If the lens is going to be off for more than a few seconds, fit the camera's body cap.

It's also important to keep anything that attaches to the camera dust free, and that includes body and lens caps. So avoid keeping caps in your pockets and check for dust before fitting them to your body or lenses. ☐



▲ Use the blower part of a blower brush to clean dust from a digital SLR